development of the concepts. Nonetheless, with few exceptions, the material is clearly presented and interspersed with a number of examples.

The material up to Chapter 5 might be considered an introduction to coding for those who do not wish to cover the entire book. The concept of coding information for transmission over a noisy communication channel is introduced in Chapter 1. Chapter 3 treats linear codes, the generalization of Slepian's group codes to codes which have symbols taken from an arbitrary finite field. In Chapter 4, most of the known bounds on probability of error and on correction capability codes are presented. Chapter 5 discusses familiar examples of linear codes: Hamming codes, the Golay code, Reed-Muller codes, McDonald codes. An example of a code that is not linear is given—fixed-weight codes derived from Hadamard matrices—and this is the only such code discussed in the book.

Chapters 8–12 are devoted to more recent developments: new codes and their implementation. The discussion is unified by using a description of codes in terms of polynomial algebra, with the necessary results having been developed in Chapter 6. Implementation for particular codes in terms of encoding and decoding equipment is preceded by a general discussion of linear switching circuits in Chapter 7. Chapter 8 treats cyclic codes generally; Chapter 9, Bose-Chaudhuri codes; Chapter 10, burst-error-correcting codes, especially Fire codes. Chapter 11 gives some additional decoding methods. Recurrent codes are briefly discussed in Chapter 12, the one exception to the restriction of the book to fixed-length codes, with emphasis on the codes of Hagelbarger.

Chapter 13 is a short chapter on codes for checking arithmetic operations.

Each chapter has included a section of notes giving some background to the material within the chapter, and most chapters also contain a small set of problems. Five appendices have also been added. They give, respectively, inequalities involving binomial coefficients, a table of the entropy function, a list of irreducible polynomials over the field of two elements, a list of the preceding material which is needed to understand the contents of each section, and a list of symbols. A fairly complete 129 item bibliography appears.

In summary, the opinion of this reviewer is that this book is indispensable for those who wish to learn about or to use error-correcting codes in a serious way. They will be aided in their reading by numerous examples spread throughout the text. A few errors were noted (e.g., the existence of a Hadamard matrix of order 92 has not been settled), but they are mainly of the misprint variety. The author has stated in his preface that a list of errata may be obtained upon request.

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Characteristic Functions. By EUGENE LUKACS. Hafner, New York and Charles Griffin, London, 1960. 216 pp. $6.50.

This is a useful compendium of properties of characteristic functions, many of which were only available in French and Russian periodicals (note, however, that

many of the references have since been translated and have been made available in *Selected Translations in Mathematical Statistics and Probability*, published in 1961 by the American Mathematical Society and the Institute of Mathematical Statistics.

Characteristic functions are meant to be expression of the form $\int \exp(itx)dF(x)$, where $F(\infty) = 0$, $F(\infty) = 1$ and F is nondecreasing.

That is, this volume is billed as a textbook of pure mathematics, and the word "probability" is pronounced only a few times, presumably by mistake. But of course the book will be of greatest interest to probabilists, and even to the applied variety. Readers familiar with *Limit Distributions for Sums of Independent Random Variables*, by B. V. Gnedenko and A. N. Kolmogoroff, will find a large number of extensions of the results mentioned in that classic work (first published in 1949). The tools used are those of classical analysis and even such things as the notations 0 and o are explained in an appendix.

Book Review Editor

Probabilistic Models for Some Intelligence and Attainment Tests. By GUSTAV RASCH. Studies in Mathematical Psychology, I, Danmarks Paedagogiske Institute, Copenhagen, 1960. 184 pp. Price unknown.

We would like to briefly mention this volume, devoted to models of misreadings and of speed in oral reading tests, and to a model for item analysis. The book contains a combination of mathematics and of experimental verifications. Most of the material has never been published before.

Book Review Editor

Turbulence. Classic Papers on Statistical Theory. Edited by S. K. FRIEDLANDER AND LEONARD TOPPER. Interscience, New York, 1961. 188 pp. $6.00.

Diffusion by Continuous Movements
By G. I. TAYLOR

Note on a Theorem by G. I. Taylor
By L. F. RICHARDSON

Statistical Theory of Turbulence. Parts I–IV
By G. I. TAYLOR

On the Statistical Theory of Isotropic Turbulence
By T. VON KÁRMÁN AND L. HOWARTH

The Spectrum of Turbulence
By G. I. TAYLOR

A Review of the Statistical Theory of Turbulence
By H. L. DRYDEN

The Local Structure of Turbulence in Incompressible Viscous Fluid for Very Large Reynolds Numbers
By A. N. KOLMOGOROFF

On Degeneration of Isotropic Turbulence in an Incompressible Viscous Liquid
By A. N. KOLMOGOROFF